

CLAIMS

What is claimed is:

21 1. An electrostatic discharge protective device, said electrostatic discharge protective device comprising:

5 a first bipolar junction transistor and an second bipolar junction transistor, wherein, the base of said first bipolar junction transistor is connected together with the collector of said second bipolar junction transistor to form a first node and the collector of said first bipolar junction transistor is connected together with the base of said second bipolar junction transistor to forming a second node;

10 a first resistor, wherein said first node is coupled to the emitter of said first bipolar junction transistor, via first resistor, constituting a first pole;

15 a second resistor, wherein said second node is coupled to the emitter of said second bipolar junction transistor, via said second resistor, constituting a second pole; and

a triggering device, said triggering device is placed between said second pole and said first node.

20 2. The protective device according to claim 1, wherein said first bipolar junction transistor comprises a NPN bipolar junction transistor.

3. The protective device according to claim 1, wherein said second bipolar junction transistor comprises a PNP first bipolar junction transistor.

5 4. The protective device according to claim 1, wherein said first bipolar junction transistor and said second bipolar junction transistor are connect to constitute a silicon-control-rectifier.

10 5. The protective device according to claim 1, wherein said first node comprises a cathode gate.

6. The protective device according to claim 1, wherein said second node comprises an anode gate.

15 7. The protective device according to claim 1, wherein said first pole comprises a cathode.

20 8. The protective device according to claim 1, wherein said second pole comprises a anode.

9. The protective device according to claim 1, wherein said triggering device comprises a zener diode.

10. The protective device according to claim 9, wherein the triggering voltage of said zener diode is in a range of about 5 to 10 volts.

5 11. The protective device according to claim 1, wherein said triggering device comprises an NMOSFET having a drain connected to said first resistor, and both a source and a gate connected to said second pole.

10 12. The protective device according to claim 11, wherein the triggering voltage of said triggering device is about than 15 volts.

13. An electrostatic discharge protective device, said electrostatic discharge protective device comprising:

15 a thyristor having a cathode and an anode, wherein said cathode connects to a common discharge line and said anode connects to the terminal of a bonding pad;

20 a PNP bipolar junction transistor, an NPN bipolar junction transistor, a first spreading resistor and a second spreading resistor constituting said thyristor, wherein the collector of said PNP bipolar junction transistor is connected together with the base of said NPN bipolar junction transistor to form a cathode gate, and the base of said PNP bipolar junction transistor is connected together with the collector of said NPN bipolar junction transistor to form an anode gate;

said cathode gate is coupled to the emitter of said NPN bipolar junction transistor, via said first spreading resistor, constituting said cathode;

5 said anode gate is coupled to the emitter of said PNP bipolar junction transistor, via said second spreading resistor, constituting an anode; and

a triggering device having a zener diode, said triggering device is placed between said anode and said cathode gate.

10 14. The protective device according to claim 13, wherein the triggering voltage of said triggering device is in a range of about 5 to 10 volts.

15 15. The protective device according to claim 13, wherein said triggering device comprises an NMOSFET having a drain connected to said first spreading resistor, and both a source and a gate connected to said the terminal of said bonding pad.

20 16. The protective device according to claim 15, wherein the triggering voltage of said triggering device is about than 15 volts.

17. An electrostatic discharge protective circuitry, said semiconductor device comprising:

a bonding pad having a terminal;

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a common discharge line with open-ended design, that is, neither grounded nor connected to any source;

5 a PNP bipolar junction transistor, wherein the emitter of said PNP bipolar junction transistor is connected to said terminal of said bonding pad;

an NPN bipolar junction transistor, wherein the emitter of said NPN bipolar junction transistor is connected to said common discharge line;

10 a first resistor that is coupled with said common discharge line, wherein said first resistor is connected the collector of said PNP bipolar junction transistor with the base of said NPN bipolar junction transistor to form a cathode gate;

15 a second resistor that is coupled with said terminal of said bonding pad, wherein said second resistor is connected a base of said PNP bipolar junction transistor with the collected of said NPN bipolar junction transistor to form an anode gate; and

20 a trigger device having a zener diode, said trigger device is connected said said terminal of said bonding pad with said cathode gate.

18. The protective device according to claim 17, wherein the triggering voltage of said triggering device is in a range of about 5 to 10 volts.

19. The protective device according to claim 17, wherein said triggering device comprises an NMOSFET having a drain connected to said first spreading resistor, and both a source and a gate connected to said the terminal of said bonding pad.

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20. The protective device according to claim 19, wherein the triggering voltage of said triggering device is about than 15 volts.

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